

gan. "The monstrosity was an almost regular flower growing on the same stem with one of the ordinary form. . . . It had no lip but three regularly formed pure white petals all of the same size and shape. . . . Here, in a genus affording some of the most strikingly irregular flowers in Nature was a flower all but regular." My specimen was not such an interesting or so extreme a case of reversion of form, but it fits in well with the theories of the development of the orchid.

As a sidelight on one of Nature's many methods of preventing the perpetuation of abnormalities, let me describe a specimen of *Arethusa bulbosa* found in Gloucester in late summer, in 1906. Two faded blossoms were growing from a single root, the only two-flowered specimen I ever found. The scapes were parallel and the same length, and the two flowers faced each other in such a way that the parts were interlaced like the fingers of folded hands and the entrance of insects was effectually prevented. The flowers in fading had stuck together firmly, and the shrivelled ovaries showed plainly that fertilization had not taken place.

WABAN, MASSACHUSETTS.

SOME NOTEWORTHY VARIETIES OF BIDENS.

M. L. FERNALD.

IN 1908, the writer recorded¹ the occurrence of the common European *Bidens tripartita* L. as an apparently native plant of swamps at Percé, Gaspé County, Quebec, and at that time called attention to the characters which differentiate it from the American species, *B. frondosa* and *B. connata*, to which it is related. It was, therefore, gratifying, while exploring in August last with Messrs. Bayard Long and Harold St. John on the Magdalen Islands in the Gulf of St. Lawrence, to find, as we had expected to do, *B. tripartita* abundant there, growing either in shallow water at the margins of brackish ponds or in boggy spots near the sea-strand, and later in August to

¹ Fernald, RHODORA, X. 200 (1908).

find it growing abundantly on the marshes near the Hillsborough River in Prince Edward Island.

Upon studying the specimens collected, however, the somewhat striking fact comes out that, though in all the material from the Magdalens and from Gaspé the awns and margins of the achenes are retrorsely barbed as in the European *Bidens tripartita*, the achenes of all the material (thirty or more sheets representing three different collections) from Prince Edward Island have the margins and awns uniformly upwardly barbellate, so that the achenes suggest those of the local *B. frondosa*, var. *anomala* Porter,¹ which is known to the writer only from marshes of the lower Schuylkill and Delaware rivers (in Pennsylvania, New Jersey and Delaware), from the mouth of the Androscoggin in Maine, and from the regions of Halifax, Nova Scotia and of St. Ann's, Cape Breton. This fact, in conjunction with the incident that the three collections of *B. tripartita* gathered without field-study in Prince Edward Island should all show a parallel peculiarity, indicates that this class of varieties is worthy more attention than some students have been inclined to give them.

On account of its upwardly barbed awns, the plant of the Philadelphia region, *Bidens frondosa*, var. *anomala*, was supposed by Asa Gray² to be a hybrid of *B. frondosa* and *B.* (or *Coreopsis*) *bidentoides*, a species known only from the region of Philadelphia. But as already pointed out by Wiegand "it does not show the necessary intermediate condition of other characters, and can scarcely be considered as such [a hybrid]."³ And in a recent letter to the writer Mr. Bayard Long remarks: "All the localities, you see, are along the lower Schuylkill and Delaware waters. . . . There can be no doubt that *anomala* represents, at least in our area, a tide-water form. All the localities definitely point to this. . . . Typical *frondosa* seems very often to grow *with anomala*. . . . But despite this, I imagine you are quite right in believing *anomala* to be a real geographic variety. It certainly does *not* have anything to do with *B. bidentoides*, even in the Delaware system. Furthermore, the occurrence of var. *anomala* in the marshes of northeastern Cape Breton or of the Halifax region, 900 and 750 miles respectively from the locality of *B. bidentoides*, as well as on the lower Androscoggin, all regions which show in their

¹ Porter ex Fernald, RHODORA, v. 91 (1903).

² Gray, Syn. Fl. i. pt. 2, 296 (1878).

³ Wiegand, Bull. Torr. Bot. Cl. xxvi. 407 (1899).

floras a large number of identities¹ with the flora of southern New Jersey and adjacent districts, indicates that it is a positive geographic variety.

It is remarkable that this variation of the awns in *Bidens*, known in America in at least six species (*B. discoidea*,² *B. Eatoni*,³ *B. frondosa*, *B. connata*,⁴ and *B. tripartita*, and in *B. aristosa* to be discussed below), should not have been noted in Europe. A somewhat detailed search through European treatments of *Bidens* has failed, at any rate, to reveal any mention of such a variation in Europe. It seems, therefore, that the Prince Edward Island variation of *B. tripartita* should be treated as an endemic variety of this species, which in its typical form is known in America only from the neighboring coasts of the Gaspé Peninsula and of the Magdalen Islands. The plant may be called

BIDENS TRIPARTITA L., var. **heterodoxa**, n. var., formae typicae habitu statura etc. simile; foliis inferioribus mediisque 3-5-partitis, lobis lanceolatis argute serratis; foliis superioribus subsimplicibus vel simplicibus, eis ramorum simplicibus lanceolatis serratis; achaeniis biaristatis, margine aristisque sursum barbellatis.

Like the typical form in habit, stature, etc.: lower and median leaves 3-5-parted, with lanceolate coarsely serrate lobes; the upper leaves subsimple or simple; those of the branches simple, lanceolate, serrate: achenes 2-awned; their margins and awns upwardly barbellate.—PRINCE EDWARD ISLAND: border of salt marsh, Bunbury, August 28, 1912, *Fernald, Long & St. John*, no. 8206 (TYPE in Gray Herb.), also no. 8207 (form with many undivided leaves); fresh spring-fed marsh, Southport, August 28, 1912, no. 8205.

¹ On the lower Androscoggin and confluent lower Kennebec waters such excessively localized plants (most of them known from no other area in Maine) as *Lophotocarpus spongiosus*, *Eleocharis rostellata*, *Scirpus Smithii*, var. *setosus*, *Lilaeopsis lineata*, *Samolus floribundus*, and *Limosella aquatica*, var. *tenuifolia*; near Halifax such species as *Woodwardia virginica* (in Maine unknown east of the lower Penobscot), *Schizaea pusilla* (unknown in New England), *Typha angustifolia* (unknown in Maine from east of the lower Kennebec), *Salicornia mucronata* (unknown in Maine from east of York County) and *Ilex glabra* (unknown in New England from east of the Boston district); in Cape Breton such plants as *Schizaea pusilla*, *Lycopodium inundatum*, var. *Bigelovii* and *Iris prismatica* (unknown between York County, Maine and Cape Breton).

² "I have observed downwardly barbed awns in *Coreopsis discoidea*."—Britton, Bull. Torr. Bot. Cl. xx. 280 (1893).

³ *B. Eatoni*, var. *fallax* Fernald, RHODORA, v. 92 (1903).

⁴ "Specimens from Ithaca, N. Y., and Ohio (Selby) as well as one in the National Herbarium collected by Dr. Vasey near Washington have upwardly barbed awns but other characters the same as in the type. At Ithaca these upwardly barbed plants grow over a considerable area almost to the exclusion of the normal form; but many transitional specimens were found in which the awns bore barbs extending in either direction."—Wiegand, Bull. Torr. Bot. Cl. xxvi. 415 (1899). This is *B. connata*, var. *anomala* Farwell, Ann. Rep. Comm. Parks and Boul., Detroit. xi. 91 (1900).

In 1858, J. Q. A. Fritchey sent to Dr. Gray from the neighborhood of St. Louis a plant which in all outward characteristics was *Bidens* (at that time considered a *Coreopsis*) *aristosa* (Michx.) Britton, but differing from typical *Coreopsis aristosa*, which has the awns upwardly barbellate, in having retrorsely barbed awns. Dr. Gray was naturally interested in the anomalous plant and requested more information and material. This was sent by Mr. Fritchey on September 12, 1859, his letter saying: "Today I again examined the flower pronounced by you *Coreopsis aristosa* and which I had called a *Bidens* from the awns being barbed downwards. The awns of all achenia that I examined were barbed downwards, none were even spreading. The flowers which I examined grew in the same location that those grew in which I pressed last year and sent you. . . . In this neighborhood the plant is very abundant along the North Missouri Railroad between this [Bridgeton] and St. Louis, frequently for a mile in length and a rod in width. This plant grows so thick that at a short distance even it appears like solid gold." There are three sheets of the Fritchey material preserved in the Gray Herbarium and upon them Dr. Gray marked "*C. aristosa* in *Bidentem* transformata (*C. aristosa* turned to a *Bidens*)!!" and in a discussion of *Coreopsis*, published in 1862, he said: "*Coreopsis* and *Bidens* are separated by a single, artificial, and not wholly constant character. The group of species on which Nuttall grounded his genus *Diodonta* wholly accords with the *Platycarpæa* section of *Bidens*, except that the awns or teeth are antrorsely hispid or naked. Recently we have received, from Mr. Fritchey of Missouri, specimens of *C. aristosa*, Michx., or perhaps of a wild cross between that species and some *Bidens*, with retrorsely hispid awns."¹ And in the Synoptical Flora Dr. Gray treated the plant as a hybrid of *Coreopsis aristosa* "with *Bidens frondosa* or others."

Subsequently, however, a considerable amount of material has accumulated, which shows that this variety of *Bidens aristosa* with retrorsely barbed awns is widely distributed, collections coming in from several different sections of Illinois and Missouri. The immediate stimulus which has led the writer to study the plant was the receipt through Mr. John H. Lovell of material sent to him from Illinois for determination with the statement that it is found "in the swamps of Illinois and along the Mississippi River" and is highly esteemed by bee-keepers on account of its great yield of honey. A close study of the seven collections at hand fails to indicate that the

¹ Gray, Proc. Am. Acad. v. 125, 126 (1862).

plant has any admixture of *B. frondosa*, for except in the barbing of the awns it exactly simulates true *B. aristosa*; but so attractive is the suggestion of hybridity as an explanation of anomalous plants that one of the collections from the Mississippi Valley was labeled by its collector "*Coreopsis bidentoides* Nutt. \times *Bidens frondosa* L.," a remarkable combination to find in Illinois and Missouri since *Coreopsis* (or *Bidens*) *bidentoides* is known only from the lower Delaware River! The status of the plant will be better indicated if we call it

BIDENS ARISTOSA (Michx.) Britton, var. **Fritcheyi**, n. var., formae typicae habitu foliis achaeniis etc. simile; aristis retrorse barbatis.—Like the typical form in habit, leaves, achenes, etc.: awns retrorsely barbed.—Wet prairies and swamps of Illinois and Missouri. ILLINOIS: received through *J. H. Lovell*; Athens, September, 1868, *E. Hall*; Champaign, September 29, 1898, *H. A. Gleason*. MISSOURI: St. Louis County, September 21, 1858, September 22 and October 3, 1859 (TYPE), *J. Q. A. Fritchey*; Webb City, September 25, 1908, *B. F. Bush*, no. 5175. Adventive in MAINE: about wool waste, North Berwick, Sept. 25, 1897, *J. C. Parlin*.

Another variation of *Bidens aristosa* which is anomalous is the plant with awnless achenes, which is found at various stations in Ohio, Tennessee, Missouri and Louisiana, and is adventive in Massachusetts (Soldier's Field, Brighton, *A. S. Pease*; Sharon, *S. F. Poole*) and Connecticut (waste land, South Windham, *C. B. Graves*, no. 259^a). This is

B. ARISTOSA, var. **MUTICA** (Gray) Gattinger, Fl. Tenn. 172 (1901). *Coreopsis aristosa*, var. *mutica* Gray, Syn. Fl. i. pt. 2, 295 (1878).

The combination is here ascribed to Gattinger with hesitation, for according to a strict interpretation of the rules covering the transfer of names, Gattinger did not make the combination, for he ascribed it to Gray, who had called the plant a *Coreopsis*, and gave no bibliographical citation or synonymic reference. Unfortunately botanical literature is too full of such vaguely, hesitantly or unintentionally published names and it is a serious question whether they should be given more nomeclatorial weight than their authors actually intended.¹ By inference only can the combination be ascribed to Gattinger who merely said: "**B. aristosa** (Michx.) Britton. Var. *mutica* A. Gray"; but by the above complete citation the name is here given a more definite status.

GRAY HERBARIUM.

¹ The writer is glad to note, since this paper went into type, a similar protest by Christensen against this unintelligent or unconscious publication of new combinations.—See Am. Fern Journ. iii. 1, 2 (1913).